Amendments to the Specification:

Please replace paragraph number [16] beginning on page 7 with the following amended paragraph:

In another embodiment of the present invention, a method of determining the energy expended during use of an exercise device having a combined treadmill and stepper function, wherein the exercise machine includes dual treadle assemblies operating at a number of steps per minute and having respective treads operating at an effective tread speed may be provided. Such method comprises receiving a first value indicative of a specified weight, receiving a second value indicative of a resistance setting on the exercise device, receiving a third value indicative of an effective tread speed for the exercise device, receiving at least one fourth value indicative of [[V02]] $\underline{VO_2}$ expended by a population of exercisers over a range of resistances for the combined treadmill and stepper functions, and calculating calories burned as a function of the first value, the second value, the third value and the at least one fourth value.

Please replace paragraph number [17] beginning on page 8 with the following amended paragraph:

In another embodiment of the present invention, a method of monitoring a workout on an exercise machine configurable for a treadmill workout or for a stepper workout, wherein the exercise machine includes dual treadle assemblies operating at a number of steps per minute during stepper mode and having respective treads operating at an effective tread speed during treadmill mode may be provided. One embodiment of such method comprises: receiving a first value indicative of a weight, receiving a second value indicative of a resistance level for the exercise machine, and selecting either the stepper mode or the treadmill mode as a function of the second value. Further, when treadmill mode is selected, such method may further comprise receiving a first signal indicative of an effective tread speed and calculating calories burned as a function of the first value, the second value, the first signal, and empirical data indicative of [[V02]] $\underline{VO_2}$ expended by a population of exercisers for the treadmill mode. Also, when a stepper mode is selected, such method may further comprise receiving a second signal indicative of the number of steps per minute accomplished and calculating calories burned as a function of the first value, the second value, the second signal, and empirical data indicative of [[V02]] $\underline{VO_2}$ expended by a population of exercisers for the stepper mode.

Please replace paragraph number [59] beginning on page 24 with the following amended paragraph:

More specifically, it is to be appreciated that users of exercise devices, such as the apparatus of the present invention, generally desire to receive current, elapsed and/or final indications of how much "work" is expended during a "workout," or a given segment thereof (such as, a snapshot in time, over a given interval, or over the extended period of a single and/or a plurality of workout sessions). Commonly, exercisers measure the amount of "work" performed during exercising in terms of calories "burned." In order to determine the number of calories "burned," one commonly needs two parameters: the [[$V0^2$]] $\underline{VO_2}$ associated with a given exercise; and the weight of the exerciser. In general, the amount of calories "burned" per minute for a given exercise routine may be expressed by the following equation:

Calories per Minute = Exerciser's Weight in kG x [[$V0^2$]] $\underline{VO_2}$ x 0.005 (a constant)

(Equation #1)

Please replace paragraph number [61] beginning on page 24 with the following amended paragraph:

As mentioned above, the second component necessary to determine the amount of calories burned for a given workout is [[$V0^2$]] $\underline{VO_2}$. It is commonly appreciated that [[$V0^2$]] $\underline{VO_2}$ varies based upon the type of exercise being performed (e.g., running, swimming, stepping, biking, weight lifting and the like) and the workout setting or resistance level associated with the exercise. For well established exercise routines, such as, running on flat grounds or on an incline, cycling, and stepping (for a given step height), the [[$V0^2$]] $\underline{VO_2}$ expended has been well documented by the American College of Sports Medicine ("ACSM") and may be obtained from equations and/or charts provided by the ACSM.

Please replace paragraph number [62] beginning on page 25 with the following amended paragraph:

For a stepper function, such as that provided by at least one embodiment of the present invention, when configured in S-mode, ACSM established formulas or other formulas may be utilized. However, in the present embodiment, a non-ACSM formula, as described hereinbelow, is utilized because of the interdependencies which exist between the left and right treadles. This formula may be used to determine the amount of [[$V0^2$]] $\underline{VO_2}$ expended when performing a stepping action based upon the inches per minute "obtained" by the exerciser. In general, this relationship may be expressed by the following equation:

[[VO^2]] $\underline{VO_2}$ stepping = (HT x 0.04) + 3.5

(wherein "$\mathbf{H_T}$" = total height gained in inches per minute)

(Equation #2).

Please replace paragraph number [63] beginning on page 25 with the following amended paragraph:

In general, in order to determine [[$V0^2$]] $\underline{VO_2}$, the MCU needs the total height "$\mathbf{H_T}$" of all of the steps taken by the exerciser over a given time period. Since the actual height of any given step taken by an exerciser may vary from a previous or subsequent step, over an extended time period, $\mathbf{H_T}$ may also vary. As such, it is commonly appreciated that an exerciser will often take steps of less than full height and, therefore, less than the optimal [[$V0^2$]] $\underline{VO_2}$ will be expended by the exerciser over any given time period. In order to accurately reflect the amount of work actually performed by an exerciser, in general, an exercise apparatus, such as the various embodiments of the present invention should account for irregular stepping, as exemplified by less than full steps or extended duration steps (i.e., when the exerciser rests while stepping or when the step comes into contact with a bottom stop). Often, these variations in stepping and/or step height, and thus the determination of [[$V0^2$]] $\underline{VO_2}$ actually expended by the exerciser, may be calculated based upon measurements of the actual step height taken and the frequency of stepping. It is to be appreciated that in various embodiments of the present invention, the actual step height may be directly measured using potentiometers, encoders or the like.

Please replace paragraph number [64] beginning on page 26 with the following amended paragraph:

However, other embodiments of the present invention may not include or utilize a potentiometer, encoder or other sensor to directly measure step height taken by an exerciser and, thus, the MCU cannot directly calculate the total step height $\mathbf{H_T}$ over a given time period. Instead, the apparatus may be configured to determine [[$V0^2$]] $\underline{VO_2}$ based upon those step signals generated by the SS. When the MCU is not provided with measured step height information, the MCU may be configured to extrapolate the step height, based upon the number of steps per minute by the exerciser "$\mathbf{R_{actual}}$," as detected by the SS, in order to determine the [[$V0^2$]] $\underline{VO_2}$ expended by the exerciser over a given time period.

Please replace paragraph number [67] beginning at page 27, with the following paragraph, marked to show changes:

As such, for at least one embodiment, when the apparatus is in S-mode, an exerciser is credited with a maximum step depth **D** of six (6) inches whenever the actual number of steps per minute $\mathbf{R}_{\mathbf{actual}}$, as sensed by the SS, are less than or equal to a predetermined and empirically calculated average step rate $\mathbf{R}_{\mathbf{avg}}$ (wherein $\mathbf{R}_{\mathbf{avg}}$ equals the number of full steps the empirical average exerciser would have taken for a given weight and resistance level). As such, for an exerciser performing at or below the empirically determined average performance level (as measured in steps per minute), the work performed by the exerciser is related to the actual number of steps taken as set forth by the following formula:

$$[[V0^2]]\ \underline{VO_2} = (R_{actual} \times D \times 0.04) + 3.5$$

(wherein $\mathbf{R}_{\mathbf{actual}}$ = actual steps per minute attained and **D** = the maximum step depth)

(Equation #3)

Please replace paragraph number [68] beginning on page 27 with the following amended paragraph:

For example, a first exerciser weighs 175 pounds or 79.54 kGs and is optimally exercising at a first resistance level (i.e., $\mathbf{R}_{\mathbf{actual}} = \mathbf{R}_{\mathbf{avg}}$). Also, assume that $\mathbf{R}_{\mathbf{avg}}$ equals 40 steps/minute (i.e., based upon empirical studies, it may be determined that the first exerciser, optimally working out at a given resistance level, should be able to complete forty (40) full steps per minute). Further assume that **D** equals six inches (i.e., the maximum step depth is assumed to be six (6) inches). As such, the first exerciser, during each minute working out at this exertion level, should "obtain" a total step height $\mathbf{H}_{\mathbf{T}}$ (which may be defined as $\mathbf{R}_{\mathbf{avg}}$ x **D**) of: 40 steps x 6 inches = 240 inches/minute. Using the formula set forth above as equation #2, the exerciser's [[V0^2]] $\underline{VO_2}$ therefore would be: (240 x 0.04) + 3.5 = 13.1. Further, using equation #1, the calories burned per minute by the exerciser would be 5.2 cal/min.

Please replace paragraph number [69] beginning on page 28 with the following amended paragraph:

In another workout, however, assume the first exerciser works out at a non-optimal rate of $\mathbf{R}_{\mathbf{actual}}$ = 25 steps per minute (with all other settings remaining the same). In this situation, the exerciser's total stepping height $\mathbf{H}_{\mathbf{T}}$ would be: $\mathbf{R}_{\mathbf{actual}}$ x **D** = 25 x 6 = 150 and the resulting [[V0^2]] $\underline{VO_2}$ would be: (25 x 6 x 0.04) + 3.5 = 9.5. In short, by working out at less than the optimal performance level, the exerciser exerts less energy.

Please replace paragraph number [70] beginning on page 28 with the following amended paragraph:

However, when the same exerciser, at the same resistance level steps at a rate higher than the empirical average rate, for example, when $\mathbf{R}_{actual}$ = 65 steps per minute, while $\mathbf{R}_{avg.}$ = 40 steps/minute, the MCU accordingly reduces the total step height $\mathbf{H}_T$ by multiplying the maximum step depth **D** by the ratio of the empirical average number of steps $\mathbf{R}_{avg.}$ to the actual number of steps $\mathbf{R}_{actual}$ and thereby arrives at a modified total step height $\mathbf{H}_M$. The modified total step height $\mathbf{H}_M$ may be used in equation #2 to determine [[$V0^2$]] $\underline{VO_2}$, as follows:

$$[[\mathbf{V0^2}]]\ \underline{\mathbf{VO_2}} = (\mathbf{R}_{actual} \times \mathbf{H}_M \times \mathbf{0.04}) + \mathbf{3.5}$$

Please replace paragraph number [71] beginning on page 28 with the following amended paragraph:

For example, when the first exerciser exercises at the first resistance level and has an actual stepping rate $\mathbf{R}_{actual}$ of 65 steps per minute, [[$V0^2$]] $\underline{VO_2}$ = (65 x (6 x (40/65)) x 0.04) + 3.5 = (65 x 3.69 x 0.04) + 3.5 = 13.094 ≈13.1.

Please replace paragraph number [73] beginning on page 28 with the following amended paragraph:

In short, in order to determine the [[$V0^2$]] $\underline{VO_2}$ expended by an exerciser of a given weight, at a given resistance level, for at least one embodiment of the present invention, the MCU uses the step signal from the SS, the previously or then provided exerciser's weight, and the current resistance level setting.

Please replace paragraph number [74] beginning on page 29 with the following amended paragraph:

As discussed above, the MCU may be configured to determine an exerciser's [[$V0^2$]] $\underline{VO_2}$, without receiving an actual step height indication, by utilizing step signals and empirical data obtained during testing. This empirical data may be obtained by the process shown in Fig. 2. As shown, this process may begin with the specification of an exerciser's weight 200. It is to be appreciated, that a wide variety of exercisers of varying weights may use the apparatus. For the present embodiment, such weight range is specified as over the range of 100 - 300 pounds. However, other weight ranges may be supported, as desired, by other embodiments. Additionally, the process provides for the specification of a resistance level, for example, levels 0-12 202. At this point a first exerciser is tested to determine the actual number of steps they

may take over a given time period (e.g., a minute) 204. These results are then stored 206, and subsequent exercisers of the same weight are then desirably tested, at the same resistance level, until a sufficient set of samples have been obtained 208. Based upon this sample set, averages and statistical operations may be applied to the sample set to determine the average resistance, $\mathbf{R_{avg.}}$, associated with an exerciser of a given weight at a given resistance level 210. It is to be appreciated that these tests and corresponding measurements can be accomplished using males only, females only and/or mixed gender sample sets. Once an $\mathbf{R_{avg.}}$ for a given weight and resistance is determined, the process may continue with determining $\mathbf{R_{avg.}}$ values across varying resistance levels and/or varying exerciser weights 212-214. These additional tests then, desirably, yield a second and a third, respectively, sample sets for which curve fitting, regression analysis, standard deviation, mean or other statistical and/or other mathematical operations may be performed in order to determine relationships between: $\mathbf{R_{avg.}}$ and a given resistance level across a range of exerciser weight settings 216; and $\mathbf{R_{avg.}}$ and an exerciser's weight across a range of resistance level settings 218-220. For example, Fig. 3 shows one example of curve fitting 300 which may be used to determine the $\mathbf{R_{avg.}}$ associated with a given exerciser weight across a plurality of resistance levels. As shown, it is to be anticipated that the relationship between $\mathbf{R_{avg.}}$ and resistance level, at a given weight setting, is substantially, but not perfectly, linear.

Please replace paragraph number [75] beginning on page 30 with the following amended paragraph:

In short, it is to be appreciated that the [[$V0^2$]] $\underline{VO_2}$ expended by an exerciser will vary based upon the resistance level set for the apparatus and the fitness level of the exerciser (i.e., exercisers in less than desirable fitness may not be able to maintain $\mathbf{R_{avg.}}$ throughout an exercise routine). In short, the higher the resistance level, the greater the amount work that may need to be performed in order to depress a step a full step height. Similarly, the amount of time necessary for a step, at a given resistance level, to be depressed the full height distance may also vary based upon the weight of the exerciser.

Please replace paragraph number [76] beginning on page 30 with the following amended paragraph:

It is to be appreciated that the relationship between weight, resistance level, and $\mathbf{R_{avg.}}$ may also be expressed in a data structure, such as a table. For example, a given $\mathbf{R_{avg.}}$, at a given resistance level may be expressed in a data structure as a function of the exerciser's

weight, as shown below in Table 1. In general, it is believed that empirical testing may show that the number of steps taken by a heavier exerciser are usually greater than those taken by a lighter exerciser, over a given time period, when both exercisers are working out at the same resistance level. Using such data, the MCU can compare the actual number of steps to a given **R_{avg}**. for an exerciser of a specified weight, at a given resistance level, and extrapolate the total step height **H_T** attained by the exerciser and the [[$V0^2$]] $\underline{VO_2}$ expended by the exerciser.

Table 1

Resistance Level	**R_{avg}. for Exerciser Weight of 125 lbs.**	**R_{avg}. for Exerciser Weight of 150 lbs.**	**R_{avg}. for Exerciser Weight of 175 lbs.**
1	20	22	24
3	24	26	28
6	28	30	32
9	32	34	36
12	36	38	40

(Values provided for illustrative purposes only and are not based upon empirical results)

Please replace paragraph number [78] beginning on page 31 with the following amended paragraph:

Therefore, when configured in S-mode, at least one embodiment of the present invention may be configured to determine the amount of work, [[$V0^2$]] $\underline{VO_2}$, expended by an exerciser at a given resistance level. Based upon this determination of [[$V0^2$]] $\underline{VO_2}$, the calories burned by the exerciser per minute may be calculated using equation #1 or other suitable calculation.

Please replace paragraph number [82] beginning on page 32 with the following amended paragraph:

When in T-mode, the determination of the amount of work expended by an exerciser while exercising may be determined by using ACSM established determinations of the [[$V0^2$]] $\underline{VO_2}$ expended by an exerciser of a given weight on a treadmill of ten (10) degrees incline at a given miles/hour. These calculations and the algorithms associated therewith are well known in the art. As such, the MCU may access such ACSM algorithms, tables, or the like to determine the amount of work and the calories burned by an exerciser of an embodiment of the apparatus in T-mode.

Please replace paragraph number [84] beginning on page 33 with the following amended paragraph:

For at least one embodiment of the apparatus of the present invention, when in TC-mode, the amount of work or [[$V0^2$]] $\underline{VO_2}$ expended by an exerciser may be based upon empirical studies and the effective tread speed. These studies generally collect data points indicative of the [[$V0^2$]] $\underline{VO_2}$ expended by an exerciser over a range of resistance levels and at a range of effective tread speeds. As is commonly appreciated, [[$V0^2$]] $\underline{VO_2}$ is independent of the weight of the exerciser. As such, these empirical studies may be performed at a variety of exerciser weights, for given resistance levels and effective tread speeds. As discussed further hereinbelow, empirical studies commonly are conducted using heart rate monitoring as well as respiratory exchange monitoring.

Please replace paragraph number [85] beginning on page 33 with the following amended paragraph:

With reference to Fig. 4, one process by which [[$V0^2$]] $\underline{VO_2}$ may be calculated for an exerciser of an embodiment of the present invention is set forth. As shown, this process may begin with selecting an exerciser having a first given weight (for example, an exerciser weighing 120 pounds) and, if desired, by gender 400. The exerciser is suitably warmed-up, as set forth by established testing protocols, and the resistance level for the apparatus is set to a first level, for example, level 1 402. The apparatus also is configured for a first tread speed setting, for example, 1 mile/hour 404. Based upon these settings, the exerciser's performance, heart rate and other biometric indicators are monitored 406. Based upon this monitoring the amount of [[$V0^2$]] $\underline{VO_2}$ expended by the exerciser may be determined, recorded and saved 408. The process may be repeated, as desired, for a different tread speed setting while holding the resistance level constant, at a different resistance level while holding the tread speed setting constant, for a different exerciser weight, or for any other purpose 410-412-414. The results of these collective measurements may be used to define and/or refine [[$V0^2$]] $\underline{VO_2}$ calculations across a range of resistance levels, effective tread speeds, exerciser weights, gender and other parameters.

Please replace paragraph number [86] beginning on page 34 with the following amended paragraph:

Preferably at least ten (10) data samples are collected for each combination of resistance level and effective tread speed. As discussed previously, the [[$V0^2$]] $\underline{VO_2}$ expended

should not vary based upon exerciser weight, however, for statistical sampling purposes, data is collected based upon exercisers of varying weights. Once the desired number of data samples are collected 416, such data points may be suitably compiled and may be graphed, listed in tables, "curve-fitted" (for example, using the before-mentioned curve-fitting software or comparable software) or otherwise manipulated in order to determine the [[$V0^2$]] $\underline{VO_2}$ associated with a given resistance level and effective tread speed 418. One example of the results of measuring the calories per minute expended by a 160 pound exerciser of an apparatus of the present invention is shown in Fig. 5. In this figure, the effective tread speed is held constant while the resistance level (as specified by the "Workout Setting") is varied. As such, a substantially proportional increase in calories per minute occurs as the resistance level is incremented from an "easy" workout setting of level 1 to a "difficult" workout setting of level 12. In contrast, Fig. 6 provides a representation of the calories per minute expended by a 160 pound exerciser at given resistance levels as the effective tread speed is increased. As shown in Fig. 6, a one mile per hour increase in the effective tread speed results in an increase of approximately 2.5 calories per minute, for this empirical study.

Please replace paragraph number [87] beginning on page 35 with the following amended paragraph:

Another embodiment of a process by which empirical data may be obtained and used to calculate the [[$V0^2$]] $\underline{VO_2}$ associated with a range of resistance levels and effective tread speeds is shown in Fig. 7. As shown, this process begins with recruiting test subjects from a population which desirably varies in demographics 700. For example, for one study performed in conjunction with at least one embodiment of the present invention, the population of test subjects was obtained from the population of Adelphi University students, faculty and staff.

Please replace paragraph number [93] beginning on page 37 with the following amended paragraph:

Based upon the results of the beforementioned statistical and/or other data analysis, data points are obtained that can be mapped or "curve-fitted" (as discussed previously hereinabove) in or order to obtain graphs, tables, algorithms, data structure or the like which describe, specify or otherwise set forth the relationships between resistance levels, effective tread speeds, [[$V0^2$]] $\underline{VO_2}$, calories burned per a given time period, and/or any other parameter as desired by specific implementations of the present invention 714.

Please replace paragraph number [94] beginning on page 37 with the following amended paragraph:

To summarize, it is to be appreciated that a variety of testing regimens may be utilized to obtain empirical values for [[$V0^2$]] $\underline{VO_2}$ data/information, across a range of exercise regimens. Such data/information may be provided to or stored in the MCU, or other local or remote computational units, such that the various embodiments of the present invention may be configured to accurately calculate the calories per minute expended by an exerciser of a given weight based upon the selected effective tread speed and the selected resistance level when in TC-mode. It is to be further appreciated that such empirical testing regimens may also be applied to the other exercise modes discussed herein, to combinations of exercise modes and/or to combinations of such exercise modes with and/or apart from the utilization of an embodiment of the present invention.